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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SAINT SURIN, JACQUES M

ART UNIT PAPER NUMBER

2856

DATE MAILED: 12/06/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/766,180

Applicant(s)

DRAKE, THOMAS E.

Examiner

Jacques M Saint-Surin

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2001 and 19 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "data processor" and the second laser must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "110" has been used to designate both optical amplifier multipass and multipass optical amplifier. Correction is required.

Claim Objections

3. Claim 8 is objected because of a missing word. In line 4, the word "to" should be inserted before "absorb".

4. Claim 23 is objected as being in improper form because it depends from itself. Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 112

5. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 is indefinite as being incomplete for failing to end with a period. Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-21 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Hemmati (US Patent 5,408,480).

Regarding claims 1 and 19, Applicant's admitted prior art shows in Fig. 1:

a system (detection system 100, see: Fig. 1) for detecting ultrasonic displacements (102) in a material under test (remote target 104), comprising:

a seed laser light source (detection laser source 106) that provides first laser beam (108) having a path of propagation;

an ultrasonic induction system (diffuse signal of Fig. 1) which induces ultrasonic displacements (102) in the material under test (104);

a detection system (detector 122, see: Fig. 1) which applies said output pulse of said first laser beam to the material under test in order to detect the ultrasonic displacements and generate at least one output signal (Pdet) and
a data processor (detection system, inherently includes a data processor for processing analog output 124) to process said at least one output signal of said detection system to obtain data representative of said ultrasonic displacements. However, Applicant's admitted prior art does not suggest the use of a modulator assembly placed in said path

of said first laser beam operable to provide an output pulse having a time-dependent pulse profile. Hemmati ('480) discloses an optically driven Q-switch that responds to a short pulse of light from diode lasers for producing an output laser pulse from electronic energy stored in a laser medium. Hemmati further teaches Q-switching is thus achieved on demand by electrically pulsing the light source to produce a pulse of light directed to a Q-switch medium in the laser cavity. Electronic control of the light pulse from the external source will thus provide not only efficient Q-switching frequency but also independent control of output laser pulse width with a fast rise time for each output laser pulse, see: col. 2, lines 12-25. It would have been obvious to one having ordinary skill in the art at the time of the invention to include in Fig. 1 of Applicant's admitted prior art the modulator Hemmati in the laser source of Applicant's admitted prior art as taught above because it would have been obvious to utilize a modulator in a laser source which is driven by an external optical radiation in order to control the generation of output light from a lasing medium thereby providing the advantages of having output pulses that are easily controlled by direct modulation of low-level input control current. Thus, the above combination would be more effective and efficient.

Regarding claim 11, as discussed above, it is rejected for the reasons set forth for claim 1. Furthermore, Applicant's admitted prior art shows a multipass optical amplifier 110, and laser light amplification (multipass optical amplifier 110). Note that Hemmati discloses a modulator that includes an electronic control to meet the limitations of the controller of claim 11.

Regarding claim 19, it is a method claim that recites the steps of the system claim 1. Therefore, it is rejected for the reasons set forth for claim 1.

Regarding claims 2, 14 and 20, Applicant's admitted prior art in view of Hemmati discloses an optically driven laser Q-switch for producing an output laser, see: col. 2, lines 13-15. Regarding claim 20, it is rejected for the reasons set forth for claim 2. Furthermore, Applicant's admitted prior art discloses detection laser source 106 to generate a laser beam 108.

Regarding claims 3-4, and 12-13, Applicant's admitted prior art in view of Hemmati discloses a Q-switch where a low-power external optical pulse is used to alter the Q of the laser cavity, thereby to manipulate a high-power output light source with a low-power light source, see: col. 2, lines 54-57.

Regarding claims 5-6, and 15-16, Fig. 1 of Applicant's admitted prior art shows diffuse signal which meets the limitations of second laser to generate the second laser beam and to induce the ultrasonic displacements in the material under test (104). Furthermore, as shown in Fig. 1, the second pulsed laser beam (diffuse signal) is applied coaxially with said first pulsed laser beam (108) to the material under test (104) and phase-modulated light 112 is reflected and scattered in all directions as shown by arrows 114, see specification, page 7, lines 13-14.

Regarding claims 7-8, Fig. 1 of Applicant's admitted prior art discloses a multipass optical amplifier 110.

Regarding claims 9 and 21, Fig. 1 of Applicant's admitted prior art shows one laser light amplification assembly (optical amplifier 110).

Regarding claims 10, 17 and 24, Fig. 1 of Applicant's admitted prior art discloses collection optics 116 direct phase-modulated light 112 via fiber optic 118 into interferometer 120 which demodulates the phase-modulated light and directs an output Pdet into detector 122, see: specification, page 7 lines 16-18.

Regarding claims 18 and 25, Applicant's admitted prior art shows the analog output signal 124 to be processed by the processor for determining a location of flaws.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Drake, Jr. (US Patent 6,122,060) discloses a method and apparatus for detecting ultrasonic surface displacements using post-collection optical.

Monchalin (US Patent 4,633,715) discloses a laser heterodyne interferometric method and system for measuring the displacement.

Klein et al. (US Patent 6,008,887) discloses a single beam laser surface velocity and displacement measurement apparatus.

Monchalin (US Patent 5,402,235) discloses imaging or ultrasonic-surface motion by optical multiplexing.

Monchalin (US Patent 4,659,224) discloses an optical interferometric of ultrasonic energy.


Takamatsu et al. (US Patent 5,619,326) discloses a method of sample valuation based on the measurement of photothermal displacement.

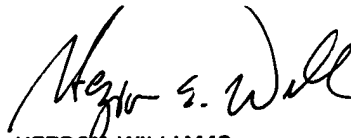
Klein et al. (US Patent 5,900,935) discloses homodyne interferometer and method of sensing material.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (703) 308-3698. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.


Jacques M. saint-Surin
November 19, 2001


HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
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